

AMENDMENTS TO THE CLAIMS

Claim 11 (currently amended):

A method for materials processing by means of plasma-inducing high-energy radiation, ~~including laser radiation, in which wherein~~ instantaneous intensity of the radiation is measured at plural locations of a vapor capillary, ~~characterized in that established by the radiation, and wherein~~ shapes of two spaced-apart peak-intensity regions (10,12) of the radiation emitted from the vapor capillary, and of a minimum region (11) that is formed between the two peak-intensity regions ~~of extreme values, are detected metrologically. metrologically~~ Metrologically detected shapes of the peak-intensity regions ~~of extreme values~~ are compared with predetermined region shapes, and control of the materials processing operation takes place as a function of deviations of the detected shapes from the predetermined region shapes.

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Claim 12 (currently amended):

The method as recited in claim 11, ~~characterized in that wherein~~ control of the materials processing operation takes

place when the shape of the minimum region (11) deviates ~~form~~
from a predetermined near-circular region shape.

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Ans*

Claim 13 (currently amended) :

The method as recited in claim 11, ~~characterized in that~~
wherein control of the materials processing operation takes
place when there are sharp regional boundaries in ~~the~~ regions
(10', 12') of transition from the shape of the minimum region
(11) to the shapes of the peak regions (10, 12).

Claim 14 (currently amended) :

The method as recited in claim 11, ~~characterized in that~~
wherein control of the materials processing operation takes
place when the shape of one of the three regions ~~of extreme~~
~~values~~—deviates from a predetermined region shape.

Claim 15 (currently amended) :

The method as recited in claim 11, ~~characterized in that~~
wherein control of the materials processing operation takes
place when the shape of a peak-intensity region (10) that is in

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a leading position, in a feed direction (14), with respect to a workpiece moving relative to the radiation, and the shape of the trailing peak region (12), deviate from predetermined region shapes.

Claim 16 (currently amended):

The method as recited in claim 11, ~~characterized in that~~
wherein control of the materials processing operation takes place when the deviation in shape exceeds either of a predetermined difference in magnitude and a predetermined difference in duration.

Claim 17 (currently amended):

The method as recited in claim 11, ~~characterized in that~~
wherein control of the materials processing operation takes place as a function of angular positions assumed by a straight line (13) passing through the peak-intensity regions (10,12) relative to a feed direction (14) of a workpiece being processed and moving relative to the plasma-inducing radiation.

Claim 18 (currently amended):

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The method as recited in claim 11, ~~characterized in that~~
wherein control of the materials processing operation takes
place when sporadically occurring, intensely radiating light
spots (22) are detected in a region of measurement ~~that is~~
~~metrologically detecting the shapes of the regions of extreme~~
~~values.~~

Claim 19 (currently amended):

The method as recited in claim 11, ~~characterized in that~~
wherein control of the materials processing of workpieces of
different thicknesses takes place when the minimum region (11)
deforms the peak region (10,12) that is in one of a leading and
trailing position in a feed direction.

Claim 20 (currently amended):

The method as recited in claim 11, ~~characterized in that~~
wherein control of the materials processing operation takes
place when two submaxima (15,16), present on both sides of a
joint path in a peak region (10) ~~that is~~ in a leading position
in a feed direction, deviate from a predetermined symmetry.

Claim 21 (new):

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and*
A method for welding by high-energy plasma-inducing radiation, the method comprising the steps of:

directing the high-energy plasma-inducing radiation at a selected weld area to effect in the weld area a radiation intensity which forms a vapor capillary;

operating sensor means to measure the intensity of radiation at two spaced apart peak intensity regions of radiation emitted from the vapor capillary and a minimum intensity region formed between the first and second peak intensity regions;

comparing the measurements obtained by the sensor means with selected predetermined data; and

modifying the intensity of the high-energy plasma-inducing radiation to substantially match measurements obtained by the sensor means with the predetermined data.